US ARMY RDECOM

U.S. Army Research, Development and Engineering Command

# *Technology Transition: The Dynamic Role of the US Army Research Laboratory Coatings and Corrosion Offices.*

ARL

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

ASETSDefense 2012
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# Outline

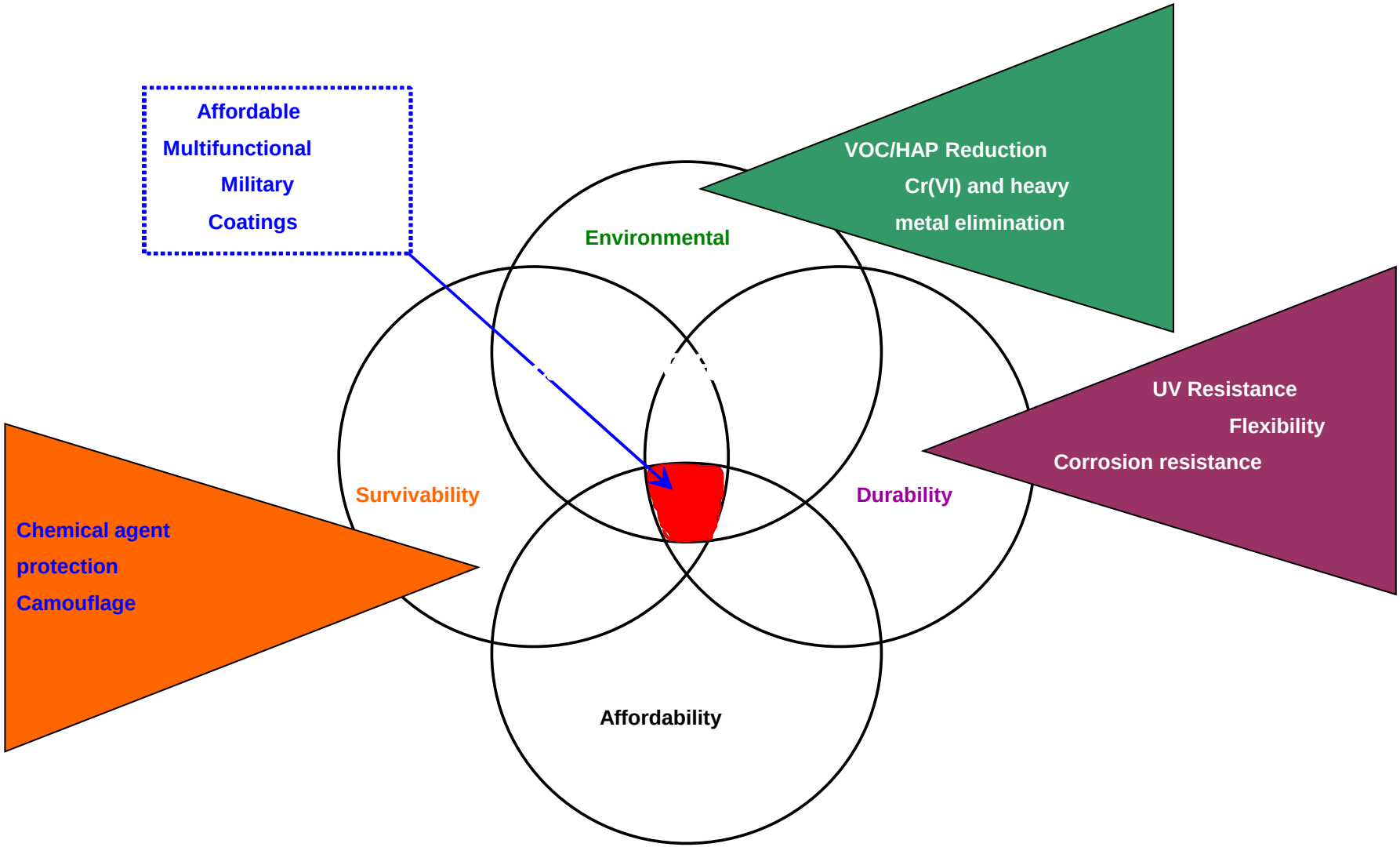


Courtesy of U.S. Army

- *Technology Transition*
- *Key Drivers to Support New Technology*
- *Major Gaps in Pretreatments*
- *Coatings and Corrosion Updates*
- *Transition of New Pretreatment Technology*

Courtesy of U.S. DoD

# Critical Coating Performance Requirements



# Key Drivers to Support New Technologies



- Transitioning New and Enhanced Technology
  - ❖ Reduction of Hazardous Air Pollutants
  - ❖ Elimination of Heavy Toxic Metals
  - ❖ Reduction of Volatile Organic Compounds
  - ❖ Enhanced Performance-Corrosion and Weathering

# Technology Transition into DOD Specifications



- Specifications
  - ❖Powder Coating-MIL-PRF-32348
  - ❖E-Coat-MIL-DTL-53084
  - ❖Enhanced Corrosion-MIL-DTL-53022/MIL-DTL-53030
  - ❖HAP-free Solvent-Memorandum and NSN’s, future MIL-T-81772 type
  - ❖Crystalline Silica Elimination-CARC Topcoats

# Major Gaps in Pretreatments



- Pretreatment for Ferrous Substrates-TT-C-490 CHEMICAL CONVERSION COATINGS AND PRETREATMENTS FOR FERROUS SURFACES (BASE FOR ORGANIC COATINGS)
  - ❖ Type I-Zinc Phosphate
  - ❖ Type III-Wash Primer conforming to DoD-P-15328
    - ➢ Contains hexavalent chromium-7% Zinc Chromate
    - ➢ Contains HAPS
    - ➢ Contains high levels of VOC-6.7 lbs/gal
    - ➢ Only pretreatment for spray application not requiring contained and regulated spray booth
    - ➢ Only pretreatment for multi-metal application

# Major Gaps in Pretreatments (con't)



- Defense Federal Acquisition Regulation Supplement; Minimizing Use of Hexavalent Chromium (DFARS Case 2009-D004).
- Proposed-52.211-4017 (TACOM) PREPARATION, APPLICATION, AND QUALITY ASSURANCE OF CARC PAINT SYSTEMS
- TACOM- Products containing hexavalent chromium shall not be used
- No available replacement for wash primer for spray application in existing spray booths.
- Direct to metal is not recommended or approved.
- ***Planned action to resolve this gap in technology is revision to TT-C-490.***

- Evaluation and demonstration of Zr pretreatments as alternatives to both Zinc phosphate and chromate conversion coatings-SERDP and ESTCP

- Evaluation of Mg-Rich and Mg-Oxide primers for application to Army aircraft-ESTCP/NAVAIR&AMCOM

- ARL pursuing non-isocyanate topcoat technologies-SERDP

# Coatings and Corrosion Updates (Con't)



- Cadmium elimination on fasteners-ESTCP
- Evaluation and demonstration of spray in place hexavalent chromium free pretreatments to replace wash primer for multi-metal application-TMR and OSD
- Development of rapid cure CARC Coatings-OSD
- Non-chromate ZVOC pretreatments-ESTCP/Kelley*

# Transition Question



- Major Questions to be Asked:
  - What is the transition method to implement new pretreatment technologies.
  - Transition to Chemical Agent Resistant Coating System.
- ***Planned action to resolve this gap in technology is revision to TT-C-490.***

# Transition of TT-C-490 New Pretreatment Technology



- Revision to TT-C-490-CHEMICAL CONVERSION COATINGS AND PRETREATMENTS FOR METALLIC SUBSTRATES (BASE FOR ORGANIC COATINGS)
  - ❖ Multi-metal application
  - ❖ Immersion and spray technologies
  - ❖ Organic and inorganic pretreatments
    - ❖Silanes
    - ❖Nano-Technology
    - ❖Zirconium Technology
  - ❖ Qualification of new technologies, cancellation of DoD-P-15328
  - ❖ Legacy systems, as zinc phosphate, will not be affected
  - ❖ Legacy systems-**Does Not Require Qualification**
  - ❖ Referenced in MIL-DTL-53072, CARC application specification

# QUESTIONS?